JOINT STANDOFF WEAPON (JSOW)

Navy-led ACAT ID Program		**Prime Contractor**
Total Number of Systems:	19,114	Raytheon
154A:	8,800 Navy; 3,000 AF	Tucson, AZ
154B:	1,200 Navy; 3,114 AF	
154C:	3,000 Navy	
Total Program Cost (TY$):	$5,999.6M	
Average Unit Cost (TY$):		
154A:	$.219M	
154B:	$.375M	
154C:	$.299M	
Full-rate production:		
154A:	1QFY99	
154B:	3QFY01	

SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2010

The Joint Standoff Weapon (JSOW) is a family of kinematically efficient, air-to-surface glide weapons, in the 1000-lb class, that provide standoff capabilities from both high and low altitudes. JSOW will be used against land and sea targets, and will operate from ranges outside enemy point defenses, providing the warfighter with standoff ***precision engagement*** capability. A launch and leave weapon,

JSOW employs a tightly coupled Global Positioning System/Inertial Navigation System and is capable of day/night and adverse weather operations. The weapon will be both land and carrier based.

Weapon planning will be accomplished using the Navy's Tactical Automated Mission Planning System (TAMPS) and the Air Force Mission Support System (AFMSS). JSOW will be employed on the following aircraft: F/A-18A/B, C/D, and E/F; AV-8B; F-14A/B and /D; F-16C/D; F-15E; F-117A; B-1B; and B-52. The weapon comes in three operational variants.

- AGM-154A (JSOW Baseline): The warhead of the AGM-154A consists of 145 BLU-97/B submunitions. The BLU-97/B is a combined effects munition. The bomblets have a shaped charge for an armor defeat capability, a fragmenting case for material destruction, and a zirconium ring for incendiary effects. JSOW Baseline is designed to conduct pre-planned attacks on stationary soft targets such as: air defense sites, parked aircraft, components of airfields and port facilities, command and control antennas, stationary light vehicles, trucks and artillery, and refinery components.

- AGM-154B: The payload for the AGM-154B is the BLU-108 submunition from the Air Force Sensor Fuzed Weapon (SFW). JSOW will carry six BLU-108s, each of which dispenses four warheads or skeets. The skeets carry an infrared or dual mode sensor, and upon detecting a target, detonate to create an explosively formed penetrator that impacts the target. This system is an interdiction weapon with a target set identical to the SFW, which consists of mixed units of tanks, infantry fighting vehicles/armored personnel carriers and trucks in a tactical road march formation.

- AGM-154C (Unitary Variant): The AGM-154C will use an autonomous Imaging Infrared terminal seeker. The AGM-154C will carry the BLU-111/B variant of the MK-82 500-pound general-purpose bomb, equipped with the FMU-152 Joint Programmable Fuze (JPF), and is designed to attack point targets such as industrial facilities, logistical systems, and shipping locations.

BACKGROUND INFORMATION

The JSOW program was reviewed by the Defense Acquisition Board in June 1989, and was granted Milestone I approval to enter the Demonstration and Validation phase for the JSOW Baseline (AGM-154A). In April 1992, the JSOW baseline program completed DAB Milestone II and entered EMD. Milestone III for the AGM-154A and LRIP for the AGM-154B were granted 1QFY99. The AGM-154B Milestone III decision is scheduled for 3QFY01 and LRIP for AGM-154C is scheduled for FY02.

DOT&E observed Navy OPEVAL in 1997, Air Force IOT&E in July 1998, all LFT&E activities for JSOW baseline, and independently evaluated the test results. All testing was completed and evaluated to support the Milestone III decision in October 1998.

The JSOW program is incorporating a new Low Cost Control Section (LCCS) and Low Cost Guidance Electronics Unit (LCGEU) into all variants. This change is planned prior to final OT and full-rate production decisions of AGM-154B and AGM-154C variants, but will be cut into the full-rate production of AGM-154A.

AGM-154B LFT&E is based upon live fire testing conducted for the Sensor Fuzed Weapon program. Due to delays in the SFW P3I program, the JSOW Joint Program Office funded the SFW program to develop a baseline BLU-108 warhead modified to incorporate an Insensitive Munitions (IM) fill. AGM-154Bs will use this interim risk reduction warhead until the SFW P3I warhead becomes available.

During FY98, DOT&E performed an independent LFT&E assessment on the lethality of JSOW/BLU-97 based on data obtained from the BLU-97 IM warhead characterization test, DT-IIC and OT-IIA live missile drops and OPEVAL live drops. The results of the assessment were included in the combined JSOW/BLU-97 Operational and Live Fire Test Evaluation Report to Congress.

TEST & EVALUATION ACTIVITY

FY99 OT&E activity consisted of test planning for tests to be conducted in early FY00. AGM-154A is scheduled to have an end-to-end test in January 2000, including captive avionics integration missions and live launches from a B-52. This will include a side-by-side launch of two AGM-154A weapons, with one incorporating the new LCCS and LCGEU. This test will be used to evaluate any effects on the performance of AGM-154A due to the new LCCS and LCGEU.

AGM-154B is scheduled to have a production verification test, including a launch of a live LRIP AGM-154B in January 2000, to complete end-to-end interoperability and two DT/OT launches in 2QFY00 (prior to MOT&E in FY00.) AGM-154C is scheduled to begin its developmental testing in FY00 and operational testing in FY01, concluding with OPEVAL in FY02.

Testing conducted during FY99 to support the IM risk reduction effort has also supported LFT&E. A 10-shot warhead qualification test series was conducted by the Joint Munitions Evaluation Program Office (Chicken Little) to support this effort. The results of the testing were compared directly with the baseline BLU-108 warhead data, and via a comparative analysis using modeling and simulation, to demonstrate that the IM fill substitution had not adversely affected warhead lethality.

TEST & EVALUATION ASSESSMENT

The results of Navy OPEVAL and Air Force IOT&E confirm that JSOW Baseline is operationally effective and suitable. Additionally, JSOW Baseline meets accuracy and lethality requirements when employed against fixed, soft, pre-planned targets. However, future operational testing must address several unresolved issues and unsatisfactory performance, including end-to-end interoperability with targeting aircraft/joint forces using third party and self-targeting modes of operation, GPS jamming susceptibility, and container design. Self-targeting and third party targeting will be evaluated when launch platform targeting systems and third party data source interfaces become mature. A subsequent JSOW OFP software change addressed GPS jamming susceptibility. Operational testing of the OFP software change was conducted and results are being analyzed. The container was redesigned and fielded. These areas will also be assessed during operational testing of JSOW BLU-108 (AGM-154B). DOT&E will continue to monitor and report JSOW test and evaluation activity.

Preliminary results suggest that the IM risk reduction program was successful and the IM modified warhead retains equivalent lethality to the baseline SFW BLU-108 warhead. The Joint Program Office and Chicken Little will provide a final report on this testing to DOT&E for review.

Sixty-two AGM-154A weapons have been employed against fixed and relocatable targets in combat operations to date, 51 in Operation Southern Watch and 11 in Operation Allied Force. Although battle damage assessment reports are not sufficient to robustly evaluate operational effectiveness, operational reports from the fleet are enthusiastic.

CONCLUSIONS, RECOMMENDATIONS, LESSONS LEARNED

Test results indicate that BLU-97 submunitions have a propensity to cluster and distribute uneven impact patterns. This is contrary to the uniform distribution assumption employed in the Joint Munitions Effectiveness Manual (JMEM). On account of the clustering effect, it appears that JMEM overestimates damage and more weapons may be required to destroy the target than predicted. The capability to model random submunition distribution within the impact pattern should be incorporated into future versions of JMEM methodology. Until success with two-missile missions is demonstrated, commanders and mission planners will need to consider releasing more than two missiles, especially for high value targets.

Early involvement by DOT&E/LFT ensured that the data gathered during the 10-shot warhead qualification series supported the risk reduction program.